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results of experimental cultures, directions for raising various crops with appropriate fertilizers, business maxims, a plea for good roads, etc. It has neither coherence nor apparent object beyond advertising under the guise of a handbook.—C. R. B.

**Botanical literature.**—Section M of the International Catalogue of Scientific Literature, devoted to botany, was published in July by the Royal Society of London. It contains the literature for 1904, and some belated entries for the preceding three years.<sup>9</sup> The volumes are improving in comprehensiveness and accuracy. Certainly no research laboratory can do without them.—C. R. B.

**Volatile oils.**—The semi-annual report of SCHIMMEL & Co., dated October-November 1906, contains an unusually extensive statement of the trade conditions respecting the volatile oils and the plants which produce them. Fifty pages also are devoted to a summary of recent researches on terpenes and the terpene derivatives.<sup>10</sup>—C. R. B.

**Genera Siphonogamarum.**—The ninth fascicle of DALLA TORRE and HARMS<sup>11</sup> list of the genera of seed plants continues the general alphabetical index of names, the last entry being *Diplopeltis*.—J. M. C.

## NOTES FOR STUDENTS

**Galvanotropism of roots.**—Two studies on this topic appeared almost simultaneously last autumn. SCHELLENBERG investigated the influence of salts on the direction of growth of the roots of peas,<sup>12</sup> using roots of seedlings grown to a length of 3–4 cm in moist sawdust and then fixed vertical in very dilute solutions of various salts, with cotyledons exposed. The experimental vessel with the solution was connected by filter-paper bridges with vessels at each side which contained the same solution, and into these were led metallic electrodes with a current of 2–6 volts, and 0.1 to .001 milliampere. Neglecting the effects of stronger currents, which produce curvatures due to death or disturbances of growth, the vast preponderance of response was a turning toward the anode,  $\text{NH}_4\text{Cl}$  alone showing 6 out of 8 curvatures toward the cathode. Chemotropic studies have shown that the reaction changes with concentration; it likewise

<sup>9</sup> International Catalogue of Scientific Literature. Fourth annual issue. M. Botany. Published for the International Council by the Royal Society of London. London: Harrison & Sons. 37s. 6d.

<sup>10</sup> Semi-annual report of SCHIMMEL & Co. (FRITSCHÉ BROS.). Miltitz near Leipzig. 12mo. pp. 161. New York: Fritsche Bros. 1906. Free.

<sup>11</sup> DALLA TORRE, C. G. DE, and HARMS, H., *Genera Siphonogamarum ad systema Englerianum conscripta*. Fasc. 9. pp. 641–720. Leipzig: Wilhelm Englemann. 1907. M 6.

<sup>12</sup> SCHELLENBERG, H. C., *Untersuchungen über den Einfluss der Salze auf die Wachstumsrichtung der Wurzeln, zunächst an der Erbsenwurzel*. Flora 96:474–500. 1906.